

REMARKS

In the non-final Office Action, the Examiner rejects claims 1, 3, 4, 8, 16, 17, 22-26, and 36-40 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. (U.S. Patent No. 6,721,371) in view of PATEL et al. (U.S. Patent Application Publication No. 2004/0213358); rejects claims 5-7, 13, 27-29, and 33 under 35 U.S.C. § 103(a) as being unpatentable BARHAM et al. in view of PATEL et al., and further in view of QUIGLEY et al. (U.S. Patent No. 6,650,624); rejects claims 14, 15, 34, and 35 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., in further view of QUIGLEY et al., and in further view of PEYROVIAN (U.S. Patent No. 5,768,682); rejects claims 9, 10, 12, and 30-32 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., further in view of QUIGLEY et al., and in further view of Applicant's Fig. 17(A).

Claims 1, 3-10, 12-17, and 22-40 remain pending in the present application. All claims are patentable over the prior art of record for at least the reasons set forth in detail below. Reconsideration and allowance of claims 1, 3-10, 12-17, and 22-40 are respectively requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 1, 3, 4, 8, 16, 17, 22-26, and 36-40 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al. Applicant respectfully traverses.

A proper rejection under 35 U.S.C. § 103 requires that three basic criteria be met. First, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest each and every claim limitation. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not the applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). BARHAM et al. and PATEL et al., whether taken alone or in any reasonable combination, do not disclose or reasonably suggest the combination of features recited in Applicant's claims 1, 3,4, 8, 16, 17, 22-26, and 36-40.

For example, claim 1 recites a method of demodulating multiple channels, including providing a first analog to digital converter having an analog input and a digital output; providing a first plurality of digital demodulators, each demodulator having a programmable center frequency; coupling a band of frequencies to the analog input of the first converter, the band including a first plurality of channels; creating digitized samples of the band at the output of the first converter; coupling the digitized samples to the plurality of demodulators; demodulating a second plurality of channels from the band of frequencies; maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the

filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator. The combination of BARHAM et al. and PATEL et al. does not disclose or suggest the combination of features recited in claim 1.

For example, BARHAM et al. and PATEL et al. do not disclose or suggest maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths, as required by claim 1. In making the rejection, the Examiner acknowledges that BARHAM et al. does not disclose this feature and relies on paragraphs 0050, 0051, and 0055 for allegedly disclosing using pre-stored filter coefficients in nonvolatile storage (Office Action – pgs. 3-4). Applicant respectfully disagrees.

At paragraphs 0050 and 0051, PATEL et al. discloses:

A digital multiplexer 236 responds to the pilot carrier presence detector 34 detecting pilot carrier accompanying the received HDTV signal, which is indicative that the received HDTV signal is a VSB signal, to select the real samples of this signal supplied from a VSB in-phase synchronous detector 290 for application to a bandpass FIR digital filter 237 that provides a selective response centered at 10.76 MHz, which selects the 10.76 MHz symbol frequency of the VSB signal. The filter 237 response is squared by a digital multiplier 238, which multiplier 238 can either be constructed from logic gates or provided by a ROM storing a look-up table of squares. The product output signal from the digital multiplier 238 operated to square samples has a strong component at the second harmonic of the 10.76 MHz component of the filter 237 response, and a bandpass FIR digital filter 239 that provides a selective response centered at 21.52 MHz selects this second harmonic for application to the DAC 232 as its digital input signal descriptive of its 21.52 MHz reference carrier analog output signal.

The digital multiplexer 236 responds to the pilot carrier presence detector 34 not detecting pilot carrier accompanying the received HDTV signal, which is indicative that the received HDTV signal is a QAM signal, to select the product output signal of a digital multiplier 23A for application to the bandpass filter 237 that provides a selective response centered at 10.76 MHz. The digital multiplier 23A, which multiplier 23A can either be constructed from logic gates or provided by a ROM storing a look-up table of squares, squares the samples supplied from a bandpass FIR digital filter 23B that provides a selective response centered at 5.38 MHz, which selects the 5.38 MHz symbol frequency of a baseband QAM signal. This baseband QAM signal can be supplied either from a QAM in-phase synchronous detector 250, as shown in FIG. 3, or from a QAM quadrature-phase synchronous detector 255, as shown in FIG. 5.

This section of PATEL et al. discloses that received VSB HDTV signals are filtered around 10.76 MHz by bandpass filter (BPF) 237, with the output of filter 237 squared by multiplier 238 to generate a signal around 21.52 MHz, a second BPF filter 239 for passing 21.52 MHz is then applied to form an output signal to digital to analog converter (DAC) 232. Conversely, if the received signal is a QAM HDTV signal, the received signal is initially filtered by BPF 238 around 5.27 MHz. The filtered signal is then squared by multiplier 23A to generate a 10.76 MHz signal. This signal is then processed in the same manner as a VSB signal. This section of PATEL et al. further discloses that multipliers 238 and 23A may be stored in a ROM.

Contrary to the Examiner's position, this section of PATEL et al. does not disclose maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths, as required by claim 1. Rather, the filter coefficients for each of filters 236, 238, and 239 are preset in their respective filters and are not retrieved from non-volatile storage. This follows from the fact that each filter in PATEL

et al. is configured to pass only a particular bandwidth and is not dynamically configurable.

At paragraph 0055, PATEL et al. discloses:

The samples from the in-phase synchronous detector 290 applied as input signal to the clocked digital delay line 323 are applied without delay as input signal to a mean-square-error gradient detection filter 326. The filter 326 is a finite-impulse-response digital filter having a $(-1/2)$, 1, 0, (-1) , $(+1/2)$ kernel, the operation of which is clocked by the first sampling clock. The prescribed number of sample periods of delay provided by the clocked digital delay line 323 is such that filter 326 response is in temporal alignment with the difference signal from the adder/subtractor 325. A digital multiplier 327 multiplies the difference signal from the adder/subtractor 325 by the filter 326 response to resolve this issue. The sign bit and the next most significant bit of the two's complement filter 326 response suffice for the multiplication, which permits simplification of the digital multiplier 327 structure. The samples of the product signal from the digital multiplier 327 are indications of the misphasing of the symbol clocking done at the receiver that are averaged over many samples (e. g., several million) by a digital lowpass filter 328 for generating the second address correction signal supplied to the adder 322 to correct the basic second address.

This section of PATEL et al. discloses that received VSB signals may be applied without delay to a gradient detection filter 326. Filter 326 is a finite-impulse-response digital filter having a $(-1/2)$, 1, 0, (-1) , $(+1/2)$ kernel, the operation of which is clocked by the first sampling clock. Filter 326 is not adjusted based on pre-computed sets of filter coefficients maintained in non-volatile storage, with each set corresponding to one of multiple low-pass digital filters, and each filter having one of a predetermined set of bandwidths, as would be required by claim 1.

For at least the above reasons, claim 1 is patentable over the cited combination of BARHAM et al. and PATEL et al. Reconsideration and allowance of claim 1 are respectfully requested.

Claims 3, 4, 8, 16, 17, 22, 23, and 38 depend from claim 1. Accordingly, these claims are patentable over the combination of BARHAM et al. and PATEL et al. for at least the reasons set forth above with respect to claim 1. Moreover, these claims are patentable for reasons of their own.

For example, claim 3 recites loading the coefficient latches in the first demodulator with transformed coefficients corresponding to a second center frequency. Neither BARHAM et al. nor PATEL et al. disclose or suggest this feature of claim 3. In making the rejection, the Examiner relies on col. 3, line 43 - col. 6, line 67 of BARHAM et al. for allegedly disclosing programmable demodulators having reconfigurable FIR filters (Office Action – pg. 4). Applicant respectfully disagrees.

The cited section of BARHAM et al. discloses an array of programmable demodulators 10. However, as noted-above, the Examiner acknowledges that BARHAM et al. does not disclose maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator (Office Action – pg. 3).

Accordingly, because BARHAM et al. does not disclose retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter

coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator, BARHAM et al. similarly cannot disclose or suggest loading the coefficient latches in the first demodulator with transformed coefficients corresponding to a second center frequency, as required by claim 3. For the reasons described above, PATEL et al. does not remedy this deficiency. Claim 3 is therefore patentable over BARHAM et al. and PATEL et al. for at least these additional reasons. Reconsideration and allowance of claim 3 are respectfully requested.

Independent claim 24 recites features similar to (yet potentially different in scope from) claim 1. Accordingly, claim 24 is patentable over BARHAM et al. and PATEL et al. for at least reasons similar to those set forth above with respect to claim 1. Reconsideration and allowance of claim 1 are therefore respectfully requested.

Claims 25, 26, 36, 37, 39, and 40 depend from claim 24 and are, therefore, patentable over BARHAM et al. and PATEL et al. for at least the reasons set forth above with respect to claim 24. Reconsideration and allowance of claims 25, 26, 36, 37, 39, and 40 are therefore respectfully requested.

Claims 5-7, 13, 27-29, and 33 have been rejected under 35 U.S.C. § 103(a) as being unpatentable BARHAM et al. in view of PATEL et al., and further in view of QUIGLEY et al. Applicant respectfully traverses.

Claims 5-7 and 13 depend from claim 1. The disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosure of BARHAM et al. and PATEL et al. set forth above with respect to claim 1. Therefore, Applicant submits that claims 5-7 and 13

are patentable over BARHAM et al. and PATEL et al., whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 1.

Claims 27-29 and 33 depend from claim 24. The disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosure of BARHAM et al. and PATEL et al. set forth above with respect to claim 24. Therefore, Applicant submits that claims 27-29 and 33 are patentable over BARHAM et al. and PATEL et al., whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 24.

Claims 14, 15, 34, and 35 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., in further view of QUIGLEY et al., and in further view of PEYROVIAN. Applicant respectfully traverses.

Claims 14 and 15 depend from claim 5. The disclosure of PEYROVIAN does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 5. Therefore, Applicant submits that claims 14 and 15 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al. and PEYROVIAN, whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 5.

Claims 34 and 35 depend from claim 27. The disclosure of PEYROVIAN does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 27. Therefore, Applicant submits that claims 34 and 35 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al., and PEYROVIAN, whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 27.

Claims 9, 10, 12, and 30-32 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., further in view of QUIGLEY et al., and in further view of the Applicant's allegedly admitted prior art in Fig. 17(A). Applicant respectfully traverses.

Claims 9, 10, and 12 depend from claim 5. Applicant's Fig. 17(A) does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 5. Therefore, Applicant submits that claims 9, 10, and 12 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al. and Applicant's Fig. 17(A), whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 5.

Claims 30-32 depend from claim 27. Applicant's Fig. 17(A) does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 27. Therefore, Applicant submits that claims 30-32 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al., and Applicant's Fig. 17(A) whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 27.

Conclusion

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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